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**(54) PRODUCTION OF THICK-WALLED STEEL TUBE  
 HAVING HIGH TOUGHNESS AND LOW YIELD  
 RATIO**

(57) Abstract:

**PURPOSE:** To obtain a thick-walled steel tube having high toughness, superior strength and weldability, and low yield ratio by rolling a steel of specific composition under specific conditions to form a steel plate of microstructure composed essentially of bainite, heating this steel plate to a temp. in two phase region, and performing tubemaking.

**CONSTITUTION:** The steel has a composition consisting of, by weight, 0.03-0.20% C, 0.01-0.50% Si, 0.5-2.0% Mn, 0.005-0.10% sol.Al, further one or  $\approx 2$  kinds among

0.005-0.05% Nb, 0.01-0.10% V, and 0.005-0.10% Ti, and the balance Fe with inevitable impurities. This steel is hot rolled at  $\approx 30\%$  cumulative draft, at a temp. between the recrystallization temp. and the  $A_r$  point. Then, accelerated cooling is done at  $(0.5-30)^\circ\text{C}/\text{sec}$  cooling rate at least down to a transformation finishing temp., by which a steel plate having a microstructure composed essentially of bainite is formed. This steel plate is reheated up to a temp. in a two phase region between the  $Ac_1$  and the  $Ac_3$  point. Then, bending into cylindrical shape is started from a temp. not lower than the  $A_r$  point and working is finished at a temp. lower than the  $A_{r1}$  point, followed by cooling at a rate not lower than air cooling rate.

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